



THE EFFECT OF MU HYPERTENSION HERBAL DRINK AND A 30-MINUTE WALK ON BLOOD PRESSURE

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ABSTRACT

Hypertension among elderly may result in a number of complications if left untreated. Objective to determine the effect of giving MU hypertension herbal drink and 30 minutes of walking to reduce blood pressure. Quasi-experimental with two groups pre and post test. The study sample was 60 elderly (intervention= 30; control= 30), which was selected using purposive sampling technique. The intervention group was given MU hypertension tea and walked for 30 minutes, while the control group was only given MU hypertension tea, for 7 days each. Data was collected in April-May 2025, then analysed by Wilcoxon and Mann Whitney test ($\alpha \leq 0.05$). The intervention group experience decrease in average systolic and diastolic blood pressure of 43.87 and 30.36 mmHg. The control group experience decrease in mean systolic and diastolic blood pressure of 40.8 and 26.16 mmHg. Differences in systolic blood pressure before and after treatment in both groups ($p = 0.000$; $p = 0.000$) is found. Differences in post-test systolic and diastolic blood pressure between two groups ($p = 0.000$; $p = 0.000$) is found. MU hypertension tea and 30 minutes of walking have been proven to be effective to lowering blood pressure in the elderly.

Keywords: elderly; herbal drink; hypertension; walking

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INTRODUCTION

Hypertension, also known as high blood pressure, is a condition in which on at least two or more readings on different dates after the initial screening, systolic blood pressure is found ≥ 140 mmHg and diastolic ≥ 90 mmHg. Hypertension is known as a “silent killer” because it frequently causes no signs and symptoms, but can increase risks of serious complications such as stroke, heart disease, kidney failure, and blurred if it is not appropriately treated (Siregar, 2024).

Data from the World Health Organization (2023), the number of people with hypertension in the world reaches 1.28 billion people, with significant increase affects group age 30–79 years old. In Indonesia, according to Ministry of Health the Republic of Indonesia (2023) the prevalence is estimated to reach 63,309,620 people. In East Java Province, there are 11,008,334 sufferers of hypertension, 130,582 (13.06%) of whom are group of the elderly aged more than 55–75 years old. In Bojonegoro Regency, there are 307,953 sufferers of hypertension, while in the District of Kepohbaru 7,475 cases are recorded, 9,282 cases of which is the elderly (Bojonegoro, 2023).

Medical intervention of hypertension usually involves pharmacological therapy, such as diuretics, ACE inhibitors, beta-blockers, and calcium channel blockers. However, the use of these drugs in the long run may risk side effect such as dizziness, kidney impairment, and metabolic disorders, as a result it leads to low patient compliance on medication. Therefore such non- pharmacological approach as life style modification and the use of herbs is an important alternative (WHO, 2021).

Various herbal plants have been found to contain properties to lower blood pressure, one of which is leaves of Belimbing Wuluh (*Averrhoa bilimbi*) which contains flavonoids, saponins, potassium citrate, tannins, acid citrate, as well as formic acid. The flavonoid content works as antioxidants and

Angiotensin Converting Enzyme Inhibitors (ACE) which can prevent the formation of angiotensin II causing vasoconstriction, while potassium helps lower blood pressure by increasing sodium excretion through urine (Sukma, 2019).

Pandan Wangi leaves (*Pandanus amaryllifolius*) are also proven to have antihypertensive properties for their contents of flavonoids, alkaloids, saponins, and tannins. Flavonoids in Pandan leaves work as a direct vasodilator to vascular smooth muscle, reducing peripheral resistance, and increasing vascular elasticity. Flavonoids also inhibit activity of ACE enzyme responsible for the conversion of angiotensin I to angiotensin II (Sasabone et al., 2023)

Another plants are African leaves (*Vernonia amygdalina*) which contain active compounds including flavonoids, alkaloids, saponins, tannins, proteins, fiber, and vitamins. The flavonoid and saponin content in African leaves functions as strong antioxidants that can increase blood vessels vasodilation, reduce peripheral vascular resistance, as well as inhibit sodium reabsorption leading to decreased blood volume and blood pressure (Tihurua et al., 2023).

Moreover, Coriander seeds (*Coriandrum sativum*) contains flavonoids (such as quercetin), polyphenols, minerals (potassium, magnesium), terpenoids, and saponins. Flavonoids in coriander seeds act as ACE inhibitor enzyme and increase relaxation of arterial smooth muscle leading to vasodilation. Potassium in coriander also helps lower blood pressure by increasing sodium excretion through kidneys and reduce tension of blood vessels (Dewi et al., 2023).

In addition to the use of herbs, mild exercise like walking is also proven to be effective in lowering pressure blood. Previous study reports that the elderly with hypertension who walked for 8 weeks experience significant decline in pressure blood (Rahmawati et al., 2023). Previous study shows that 30 minute walk 4 times a week can lower systolic blood pressure by 20 mmHg and diastolic by 10 mmHg. This mechanism occurs through increased elasticity of blood vessels, decrease peripheral vascular resistance, and increased nitric oxide production (Silwanah et al., 2020).

Based on the description above, there has not been a study which combines giving MU Hypertension herbal drink (combination Blimbing Wuluh leaves, Pandan Wangi leaves, African leaves, and coriander seeds) and physical intervention of 30- minute walk for the elderly with hypertension. Therefore, researcher is interested to conduct this study to find out effectiveness of those combinations to reduce blood pressure in elder population. It is expected that this finding can be an easy, safe, applicable, and affordable intervention for the people. This study aims to know how the combination of giving MU hypertension herbal drinks and walking for 30 minutes reduces blood pressure in the elder population with hypertension in Bumirejo Village, District Kepohbaru, Bojonegoro Regency.

METHOD

This is a quantitative study utilising Quasi Experiment Two Group Pre and Post-Test design, a study with two intervention groups, the blood pressure whose is measured before and after the intervention. The researchers have the intervention group drink warm hypertension -MU herbal drinks and 30- minute walk while the resercers have the control group drink warm hypertension - MU herbal drinks. This study was conducted in Bumirejo Village, Kepohbaru District, Bojonegoro Regency from April to May 2025. Independent Variable in this study is Hypertension -MU herbal drinks and 30 minutes walk, while the dependent variable is blood pressure.

This study involved 115 elderly people with hypertension in Bumirejo Village. 60 elderly were selected by employing purposive sampling technique based on inclusion and exclusion criteria, which were randomly divided into 30 elderly people in the intervention group and 30 elderly in the control group. 55 elderly were excluded from this study due to age >75 years, and /or rarely attended Posyandu Lansia (healthcare programme intended for the elderly held in monthly basis).

Inclusion criteria includes the elderly with hypertension aged 60-75 years old whose blood pressure $\geq 140/90$ mmHg, able to walk for at least 30 minutes, currently not on antihypertensive treatment for the last a month, and willing to become respondents for 7 days. Exclusion criteria includes the elderly with hypertension who experience hearing and sight impairment, have history of stroke, Chronic Kidney Failure, severe Coronary Heart Disease, consume other antihypertensive herbal medication and/or developing musculoskeletal disorders which impair walking activity. Respondents were declared dropped out if missing at least two interventions for 7 days and/or resigning from this study.

Interventions given to intervention groups is Hypertension -MU herbal drinks, consisting of combination a number of dried leaves and seeds: Blimbing Wuluh (20 leaves), Pandan Wangi (3 leaves), Africa leaves (9 leaves), and coriander seeds (2 tablespoons). This mixture is boiled in 250 mL water for ± 4 minutes until 100 mL left, it is then filtered and served warm to each respondent. This drink is consumed twice a day; Morning at 7 pm and afternoon at 3 pm, for 7 days concecutively. After consuming the herbal drink, the resercers have the elderly walk for 30 minutesbarefoot at the village's soccer pitch. the researchers only have the elderly in the control group consume Hypertension-MU herbal drink without walking, with the same frequency and dose; 100 mL twice a day for 7 days. Measurement of blood pressure is done before consuming the herbal drinks and 45 minutes after consuming the herbal drinks.

The instruments of this study includes procedure for making warm hypertension -MU herbal drink, procedure for walking, and observation sheets to record the results of blood pressure measurement for each respondent from day 1 to day 7. Blood pressure measuring device used is pre-calibrated Omron brand digital sphygmomanometer (6 units) to ensure accuracy and reliability of blood pressure measurement. Data collection Procedure is initiated by giving information to respondents as to the objectives and benefits of this study as well as the procedures. Respondents who are eligible and willing are requested to sign the consent form. this study is done gradually; 10 elderly for period 1. Upon completing 1 stage, the next stage is continued with different people. During the data collection process, the researchers are assisted by 10 research assistants. The initial stage is done to intervention groups then continued to the group control.

Blood pressure measurement is done in day 1 (pre-test) to both groups. After that the researchers have the intervention group consume warm hypertension -MU herbal drink and walk, the researchers have the control group consume Hypertension -MU herbal drinks for 7 days consecutively. On the 7th day in the afternoon, blood pressure measurement is taken 45 minutes after consuming warm hypertension -MU herbal drink blood pressure measurement is repeat (post-test) on each elderly who have completed 7 days therapy. Data scale of this study uses Ratio data scale. Data normality test is carried out first to each data group. The results of the Shapiro-Wilk test on the pre-test data of systolic blood pressure to intervention group shows p value = 0.048, meaning that the data is abnormally distributed. In the post-test of systolic blood pressure, p value = 0.114, which means normal data. In The pre-test of diastolic blood pressure shows p = 0.277, which means the data was normally distributed and the post-test p = 0.000, which means the data was abnormally distributed, so to analyse the comparison of pre -post test blood pressure in the intervention group, it is tested by using the Wilcoxon test.

The Shapiro Wilk test on the control group shows pre-test systolic blood pressure p value = 0.084 and post-test p = 0.164, meaning that the data is normally distributed. to compare pre-test post test systolic blood pressure by Paired t-test is used. The normality test on diastolic blood pressure shows normal data distribution (p = 0.144) and post-test p = 0.027 which means the data was abnormally distributed, Therefore it is tested by using the Wilcoxon Test. Data processing was carried out by using SPSS version 26 with margin of error $\alpha \leq 0.05$. This study has been declared ETHICAL by the Research Committee of Ethics Muhammadiyah University of Lamongan Number: 124/EC/KEPK-S1/03/2025 on March 23, 2024. This Ethics Permit shows that this study has fulfilled

the research ethic principle, including sufficient information to respondents, consent to participate in this study without coercion (informed consent), data confidentiality, and rights protection and security of study's subject in accordance with standard for healthcare study.

RESULT

Total number of the elderly participating in study counting for 60 people, 55 elderly were excluded from this study due to failure meeting the inclusion criteria, none of whom dropped out during the research process. Majority of the elderly in the intervention groups and control groups are female 93.3% and 96.7%. In the intervention group, majority of the elderly aged between 60-69 years old (60.0%), while in the control group ranges from 50-59 years old (76.6%). Most of them on both groups work as farmers (83.3% and 80%) and possessing junior high school degree (83.3%) in the intervention group and possessing senior high school degree 86.7% (control group). All respondents (100%) do not smoke and have no history of chronic diseases and stomach problems (Table 1).

Table 1.
Characteristics of Respondents (n=60)

Variables		Intervention Group		Control Group	
		N	%	N	%
Gender	Man	2	6.7	1	3.3
	Woman	28	93.3	29	96.7
Age	50-59 years old	10	33.3	23	76.6
	60-69 years old	18	60	7	23.3
	70-79 years old	2	6.7	0	0
Work	Farmer	25	83.3	24	80
	Housewife	5	16.7	6	20
Education	Elementary School	5	16.7	0	0
	Junior High School	25	83.3	4	13.3
	Senior High School	0	0	26	86.7
Smoking	Yes	0	0	0	0
	No	30	100	30	100
Chronic Disease	Yes	0	0	0	0
	No	30	100	30	100
Gastric Disease	Yes	0	0	0	0
	No	30	100	30	100

Table 2.
Pre-test and post-test blood pressure in Intervention and Control groups (n=60)

Group	Blood pressure		Mean (mmHg)	Category
Intervention	Pre-test	Systolic	156.80	Hypertension Grade 1*
		Diastolic	96.63	Hypertension Grade 1*
	Post-test	Systolic	112.93	Normal*
		Diastolic	66.27	Normal*
Control	Pre-test	Systolic	156.23	Hypertension Grade 1*
		Diastolic	95.13	Hypertension Grade 1*
	Post-test	Systolic	115.43	Normal*
		Diastolic	68.97	Normal*

*According to JNC 7: Normal blood pressure Pressure (BP $\leq$ 120 mmHg and DBP $\leq$ 80 mmHg). Pre- hypertension (BP 120–139 mmHg or DBP 80–89 mmHg). Hypertension grade 1 (BP 140–159 mmHg or BP 90–99 mmHg), hypertension grade 2 (BP $\geq$ 160 mmHg or BP $\geq$ 100 mmHg) (Madden, 2003). This study reveals a decline in blood pressure for both groups is found, but the blood pressure of the intervention group declines more than the control group with the gap of 3 mmHg for systolic blood pressure and 4.2 mmHg for diastolic blood pressure (Table 2). Based on the table 3, significant decline of systolic blood and diastolic pressure in both groups is obtained. In the intervention group (hypertension MU herbal drinks and 30 minutes walk) there is decline in average systolic blood pressure by 43.97 mmHg from 156.90 mmHg to 112.93 mmHg, and blood diastolic blood pressure by 33.27 mmHg from 96.63 mmHg to 66.27 mmHg. The *paired t-test* t shows p value = 0.000 meaning difference in systolic and diastolic blood pressure before and after intervention is found.

Table 3.

Comparison of Blood Pressure between intervention and control group (n=60)

Group	Blood pressure		N	Min-Max	Mean $\pm$ SD	Δ	<i>p</i>
Intervention	TDS	Pre-test	30	150-165	156.90 $\pm$ 4.781	43.97	0.000
		Post-test	30	110-118	112.93 $\pm$ 1.790		
	TDD	Pre-test	30	93-101	96.63 $\pm$ 2.189	33.27	0.000
		Post-test	30	65-70	66.27 $\pm$ 1.112		
Control	TDS	Pre-test	30	153-160	156.23 $\pm$ 2.217	40.8	0.000
		Post-test	30	112-120	115.43 $\pm$ 2.192		
	TDD	Pre-test	30	92-98	95.13 $\pm$ 1.592	26.23	0.000
		Post-test	30	68-77	68.90 $\pm$ 1.273		

In the control group consuming only warm MU hypertension herbal drinks, average systolic blood pressure declines by 40.80 mmHg from 156.23 mmHg to 115.43 mmHg and diastolic blood pressure by 26.23 mmHg from 95.13 mmHg to 68.90 mmHg. The *Wilcoxon test* show p -value = 0.000, meaning that significant difference in systolic and diastolic blood pressure before and after the treatment is found. The intervention group experience more decline in blood pressure compared to control group. It shows that combination of consuming warm MU hypertension herbal drinks and 30- minute walk has been found effective to lower blood pressure compared to consuming warm MU hypertension herbal alone.

Table 4.

Differences in Blood Pressure in the Elderly Between Intervention Groups and Control Group (n=60)

Blood pressure		N	Mean $\pm$ SD	p
Systolic Pre-test	Intervention	30	156.80 $\pm$ 4.781	0.000
	Control	30	156.23 $\pm$ 2.176	
Diastolic Pre-test	Intervention	30	96.63 $\pm$ 2.189	0.000
	Control	30	95.13 $\pm$ 1.592	
Systolic Post-test	Intervention	30	112.93 $\pm$ 1.780	0.000
	Control	30	113 $\pm$ 2.192	
Diastolic Post-test	Intervention	30	66.27 $\pm$ 1.112	0.000
	Control	30	68.97 $\pm$ 1.273	

The Mann Whitney test in Table 4 show differences in post test blood pressure for both systolic and diastolic blood pressure (p=0.000) between intervention group and control groups meaning consuming warm MU hypertension herbal drinks and 30 minute walk can reduce blood pressure significantly.

DISCUSSION

This study shows significant decline in systolic and diastolic blood pressure for both intervention and control group. However, the mean value, combination of warm MU hypertension herbal drinks consisting of from Blimbing Wuluh leaves, Pandan Wangi leaves, Africa leaves, coriander seeds combined with walking for 30 minutes can lower more blood pressure than without walking. Blimbing Wuluh leaves contains flavonoids, tannins, saponins, and alkaloids which function as a natural vasodilator and diuretic which can help lower blood pressure. Sukma (2019) shows flavonoids, tannins, saponins, and alkaloids are effective in lowering blood pressure. Rahayu et al., (2022) also reportes significant blood pressure decline after consuming Blimbing Wuluh juice. In addition, the potassium content in Blimbing Wuluh play an important role in lowering blood pressure (Vera, 2019). Compounds in Blimbing Wuluh can inhibit activity of angiotensin converter (ACE) enzyme so it can physiologically lower blood pressure (Amri, 2022).

Pandan Wangi leaves contains alkaloids, flavonoids, and saponins that can lower blood pressure through vasorelaxation mechanism, research shows that alkaloid, flavonoid and saponin compounds in Pandan Wangi have significant vasorelaxation properties that can lower blood pressure in the elderly (Sasabone et al., 2023). African leaves are also rich in flavonoids and saponins which are able to increase vasodilation and function of endothelium blood vessels , as proven in the previous

study which shown that consuming of Africa leaves can reduce blood pressure through increased vascular function in the elderly (Tihuraa et al., 2023).

Coriander seeds contain chemical compounds such as linalool, α -pinene, γ -terpinene, geranyl acetate, camphor, geraniol, and phenolics compound, tannins, flavonoids, triterpenoids, saponins, steroids, and alkaloids that play a role to reduce peripheral vascular resistance so that they help lower blood pressure, research shows that linalool compounds and unsaturated fatty acids saturated in coriander have positive effect in lowering blood pressure in patients with hypertension (Dewi et al., 2023). In addition, the compound phenolics and flavonoids in seeds coriander own potential as antihypertensive natural in the elderly (Febriana et al., 2024).

Intervention of 30 minute walk barefoot contributes to significant decline in blood pressure. Walking is able increase elasticity of blood vessels, lowering peripheral resistance, increasing body metabolism, and reduce sympathetic activity (Sari & Wulandari, 2022). Research shows that an additional 3,000 steps per day lower systolic blood pressure by 7 mmHg and diastolic 4 mmHg in the elderly (Lefferts et al., 2023). Similar Research shows that walking lower blood pressure significantly in patients with hypertension (Malem et al., 2024). Kohort found that of 1,862 elderly show duration of walking >30 minutes / day associated with decline in arterial plaque and blood pressure (Rhian et al., 2021). In addition, regular walking can increase blood vessel elasticity through decreased speed of central pulse (PWVcf), indicator of arterial elasticity (Fantin et al., 2012). A randomized controlled trial study (RCT) on the elderly finds that timed walking exercise and measurable intensity can lower blood pressure (Moriguti et al., 2012).

Combination of MU hypertension herbal drinks and 30- minute walk can reduce blood pressure more maximally because the combination produces average decrease in SBP of 43.97 mmHg and DBP of 33.27 mmHg, which indicates more significant decrease in blood pressure compared to consuming MU hypertension herbal drinks or walking alone. Moreover, walking is easily done, cheap, and no special equipment is needed leading to practical application by people (Wulandari, 2022). Mild exercise and herbal consumption can non-pharmacological interventions for elderly with hypertension. However combination of both, as found in this study, gives more optimal results to lower blood pressure (Gartika et al., 2021; and Silwanah et al., 2020).

Other factors such as consuming local herbs is also effective to control blood pressure (Suryaningsih, 2023). Several study report diet, physical activity, alcohol consumption, smoking, and obesity are a modifiable risk factors (Falefi et al., 2019; and Nubatonis et al., 2024). Age of the elderly contribute to significant increasing risk of hypertension (Mustika, 2023). Physiological changes in the elderly like declined vascular elasticity affect blood pressure (Dartin et al., 2022). MU hypertension herbal drinks have minimal side effect. This is proven from a study showing that no respondent who reporting to have side effect. However, this study only review blood pressure, leaving other physiological factors behind, so that the long term side effect has not been known yet.

CONCLUSION

This study shows combination of MU hypertension herbal drinks and 30- minute walk are proven to be more effective in lowering systolic and diastolic blood pressure in the elderly with hypertension compared to only consuming MU hypertension warm drinks alone because the contents active compound in Hypertension MU herbal drinks (Blimbing Wuluh leaves, Pandan Wangi leaves, Africa leaves, and Coriander seeds which contains flavonoids, saponins, tannins, and alkaloids) are natural diuretic, vasodilator, and antioxidant that can increase the function of endothelium vessels so that blood pressure can physiologically reduce blood pressure. The maximal effect can be achieved if it is combined with 30 minute walk which can increase blood vessel elasticity, peripheral circulation, reduce peripheral vascular resistance, and reduce central nervous system activity, as a result more massive and stable decline in blood pressure may occur. Furthermore a

study to discover long term side effect of this therapy and its effects on vital organ such as Kidney and liver is required.

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